ROYAL GARDENS, KEW.

BULLETIN

OF

MISCELLANEOUS INFORMATION.

No. 69.] SEPTEMBER. [1892.

CCLX.—CARAGUATÁ FIBRE.

(*Bromelia argentina*, Baker.)

Under the name of Caraguatá the late Mr. Thomas Routledge forwarded to Kew, in 1877, for determination, "the leaves of a plant "from the Argentine Republic, with the remark, that the 'fibre when "abstracted no doubt will make good paper.' After some trouble, we "arrived at the conclusion that the leaves belonged to one of the "singular South American species of *Eryngium*, which have before "flowering quite a Bromeliaceous habit." [Kew Report, 1877, p. 37].

A few years later Mr. Edwin H. Egerton, C.B., then Her Majesty's Chargé d'Affaires at Buenos Ayres, referred to the Caraguatá plant in a report forwarded to the Foreign Office, dated 31st July 1881, as follows:—"But by far the best fibre of the country is that of the "Caraguatá Ibera, a Bromeliad which is something like the Pine-apple "plant, and which is very abundant in Paraguay, the Misiones, and the "Chaco. It is very long and silky, and has long been used by the "Indians, and much money has already been spent in endeavours to "find some practical machine for the economical preparing of this "fibre. I am assured that the desired result has now at length, after a "long series of experiments, been attained by a French machine "invented for the purpose which has just been set up not very far "from Asuncion, the process being a simple one without previous "maceration.

"Should this invention prove a success (and I am promised further "particulars from the persons undertaking this work) the caraguatá "fibre will become an extremely important article of export, and if half "I hear of it be true, should compete with advantage against jute.

"I am assured, but I cannot vouch for the assertion, that there is "immense superiority in the quality of the Paraguayan fibre over that "of the Chaco and Misiones caraguatá."

U 73078. 1250.—9/92. Wt. 38. A

In 1884, Mr. F. E. Harman, who had undertaken a mission to the Plate River for the Santa Fé Land Company, brought with him numerous species of Argentine grasses, which were determined at Kew, and also some living plants of what were believed to be Caraguatá from the Gran Chaco. With these plants, Mr. Harman brought a dried specimen of an inflorescence. The plants have grown at Kew, and are now in a flourishing condition in the Temperate House. As will be shown later, they are not true Caraguatá, and they possess no merit as fibrous plants. On the other hand the dried inflorescence, brought at the same time, belonged to the fibre-producing species. It is probable that the name Caraguatá is used in a generic sense in the Argentine and neighbouring countries; and, as already shown, it is applied indiscriminately to plants of a very widely different character. There is, however, a plant known as Caraguatá or Caraguatá Ibera, which yields a very valuable fibre. It has been noticed in works of travel, and its valuable properties have been highly extolled. The difficulty was to obtain authentic specimens of the true fibre-yielding plant, and find out exactly what it was. Under these circumstances a further, and as it proved a successful, effort was made to obtain specimens as shown in the following correspondence:—

ROYAL GARDENS, KEW, to FOREIGN OFFICE.

Royal Gardens, Kew,
November 20, 1889.

SIR,

I AM desired by Mr. Thiselton-Dyer to inform you that in the year 1877 the late Mr. Thomas Routledge forwarded, for determination, to Kew some fibre and leaves of a plant from the Argentine Republic known locally as Caraguatá. The leaves were broken and in an imperfect condition. Moreover, it was considered doubtful whether they belonged at all to the plant which yielded the fibre. The leaves, as far as could be ascertained from the scraps sent, belonged to a species of *Eryngium*. (Kew Report, 1877, p. 37.)

2. At the recent *Exposition Universelle* held at Paris in 1889, I noticed in the Paraguayan Court some leaves and fibre called Caraguatá said to be derived from *Bromelia Caraguata*. There is no plant known to European botanists under this name. The Caraguatá of Paraguay is a plant which it is very desirable to investigate, and specimens of it in a living and dried state would be very acceptable for the collections at Kew.

3. Mr. Thiselton-Dyer ventures to express the hope that the Secretary of State will approve of the kind offices of the Minister at Buenos Ayres being invited to procure information respecting the Caraguatá plant, its distribution, and local uses, and also small specimens of living plants, packed in a dry box, and seeds for this establishment. For a botanical determination of the plant, it is desirable to obtain dried specimens of the leaves, flowers, and fruit. These latter might be forwarded by post between sheets of paper protected by cardboard.

4. Any reasonable expense, incurred on account of this service, will be defrayed in usual course.

I have, &c.

Sir Villiers Lister, K.C.M.G.,
Foreign Office.

(Signed) D. MORRIS.

The Hon. Francis J. Pakenham to Foreign Office.

My Lord, Buenos Ayres, February 3, 1890.

On the receipt of your Lordship's despatch of this series, No. 39, of the 25th of November last, instructing me to procure specimens of the Caraguatá plant for the Royal Gardens at Kew, I communicated its contents to Dr. Stewart, Her Majesty's Consul at Asuncion, from whom I have received the reply of which copy is enclosed.

The box containing the specimens in question reached me a few days ago, and I have the honour to transmit it to your Lordship herewith, unopened, as it arrived.

I have, &c.

The Marquis of Salisbury, K.G. (Signed) F. Pakenham.

[Enclosure.]

Sir, Asuncion, January 12, 1890.

I beg to acknowledge the receipt of your letter of the 27th ultimo, and enclosed copy of a letter, dated 20th November, Royal Gardens, Kew.

By the steamer "Saturno," of the Platense Company, I have the pleasure to send to you this day a box containing samples of the Caraguatá plant, and of its fruit and inflorescence, which I hope will prove satisfactory for the purpose of determining its scientific classification.

I have, &c.

(Signed) William Stewart, M.D.

The Hon. F. J. Pakenham.

The material obtained through the Foreign Office, as shown above, and that obtained upon a subsequent occasion from Dr. Stewart direct, were submitted to Mr. J. G. Baker, F.R.S., Keeper of the Herbarium at Kew, who has furnished the following account and description of the Caraguatá plant as now known to us :—

We have now received for the first time, through the Foreign Office full material for the botanical determination of this plant, procured for us by Dr. W. Stewart, H.B.M. Consul at Asuncion. It proves to be a true *Bromelia*, nearly allied to *Bromelia Pinguin*. In the monograph of the Brazilian Bromeliaceæ just published by Dr. Mez, which forms part of the great "Flora Brasiliensis" of Endlicher and Martius, two species which are nearly allied to it are described for the first time, viz., *B. Balansæ*, Mez, from Paraguay, and *B. Regnellii*, Mez, from Central Brazil. The latter, which comes nearest to it of the three species, is figured on Plate 53. The description of *Rhodostachys argentina* in my *Handbook of the Bromeliaceæ*, p. 29, so far as regards the inflorescence in a state of fruit, relates to the present plant; but now that we have the flowers, they show that the plant is not a *Rhodostachys*, but a *Bromelia*, and that the leaves that were originally sent with it do not really belong to the same species as the flowers. We are therefore very much indebted to Dr. Stewart for enabling us to clear the matter up, and I give now a full description of the plant under the name of *Bromelia argentina*, drawn up entirely from his latest specimens, received Feb. 10, 1892.

Bromelia argentina, *Baker, n. sp.* Leaves like those of *B. Pinguin*, ensiform, rigidly coriaceous, 5 feet long, 1½ inches broad exclusive of the prickles above the dilated base, tapering very gradually to the point; prickles large, deltoid cuspidate, uncinate, brown and horny in the upper half, about an inch apart in the centre of the leaf. Peduncle stout, nearly a foot long, covered by the closely imbricated ovate-lanceolate scariose bract-leaves, the lower of which are about 3 inches long, and the upper 2 inches long. Inflorescence a dense oblong head, which is half a foot long in the flowering stage; lower bracts ovate, toothed at the top, with a bright red lanceolate point; flowers many in each cluster, subtended by a large ovate bract; flower-bracts oblong, acutely keeled, 1½ inches long; ovary in the flowering state oblong, trigonous, tomentose, an inch long, ⅓ inch diam. Sepals oblong, obtuse, an inch long. Petals red, lingulate, a little longer than the sepals. Stamens and style shorter than the petals. Fruit oblong, coriaceous, 1½ inches long when dried.

It will be noticed that Mr. Baker considers the Caraguatá plant to be nearly allied to the Pinguin (*Bromelia Pinguin*, L) of the West Indies and Central America. It has also some resemblance, as regards leaf character alone, to *Karatas Plumieri*. The latter is a well-known and valuable fibre plant. It is said to be used by Indians in making the finest hammocks in Central America, Guiana, and Brazil. The fibre of the Pinguin was carefully investigated by the Botanical Department in Jamaica in 1884. The plant covers hundreds of acres in the island, and it would readily support a large industry. Great difficulty was, however, experienced in extracting the fibre by machinery, without maceration, and the results were by no means satisfactory. Several samples were forwarded to London and New York for the opinion of brokers, and the London reports were as follows:—"Poor dull fibre, "gummy, fair strength, value about 20*l*."—"Almost unsaleable in the "form sent, not well dressed, not good colour, and in some parts rather "tender."—"If this was better dressed, it might have a sale here, but "in the present form, when so gummy, it is difficult to form an estimate "of it. It comes from one of those plants that suggest the effect of an "alkali upon it for melting away the gum, to see if a better product "could not be produced."

It is possible that the Caraguatá may yield fibre more closely resembling that obtained from Karatas than from Pinguin. There are specimens of leaves and fibre of all three plants shown in Museum No. II. at the Royal Gardens, and some samples of Pinguin fibre in this collection cleaned by hand are of better quality than those prepared by machinery in Jamaica. The fibres obtainable from species of Bromeliaceæ, including those from the common pine-apple (*Ananas sativus*), as well as from *Karatas*, Pinguin, and the Caraguatá now under consideration, are all of commercial importance; but, like many others, they require suitable appliances for their extraction, and until these are forthcoming they will remain unavailable for any but the most limited purposes.

In regard to the local utilisation of Caraguatá fibre, the following extract is taken from a recent Report by Mr. Arthur Herbert [Foreign Office, 1892. Annual Series, No. 1,006. Diplomatic and Consular Reports on Trade and Finance. Paraguay]:—

"The textile plant called Caraguatá abounds and grows naturally in every part of the Paraguayan Republic.

"In the year 1879 Messrs. Branlio Artecona and Louis L. Lenguas made experiments with machinery that they established in the department of Arroyos y Esterios, having obtained from the Government a concession for the working of this product freely for the space of 15 years in all fiscal lands, and to export the same when manufactured free of duty.

"This industry did not give satisfactory results, owing to the inexperience of those in charge and the imperfection of the machinery. After several fruitless attempts they retired, and their concession lapsed.

"In 1889–90 Mr. Artecona again organised the same industry with modern machinery, and took a contract from the company 'Tejidora,' of Buenos Ayres, for all he could remit. He remitted altogether 400 tons, and the result of the sale might have been remunerative if he had not committed the fault of employing inexpert hands and spent his capital in useless experiments, and he again suspended operations.

"Attending to sundry requests from Europe, certain commercial men have lately remitted samples that arrived in perfect condition, from which a profitable result was obtained; but when they remitted large quantities in the year 1890 it fermented on the voyage, and arrived in Europe in an unacceptable condition.

"The *ibera* is a sort of Caraguatá, and its fibre is of a finer quality than that of its congener, but neither of them has obtained any importance in commerce, owing to the cost of cleaning and separating the fibre from the leaves. Several attempts as above mentioned have been made, but so far without any great success. From the interest which has been awakened in this product in European markets, it would seem to deserve a more serious study, and the opinion seems to prevail that with improved machinery and more skilled administration more profitable results might be obtained.

"The flowers have been sent to Kew with a view to determining their exact species, which I believe is still undefined."

CCLXI.—DECADES KEWENSES.

PLANTARUM NOVARUM IN HERBARIO HORTI REGII CONSERVATARUM.

DECAS III.

21. **Polyalthia Schefferi,** *Stapf.* [Anonaceæ]; affinis *P. Jenkinsii,* Benth. et Hook. fil., sed foliis basi cuneatis, floribus minoribus extra-axillaribus.

Raised at Kew from seeds sent by Dr. R. H. Scheffer, the late Director of the Botanic Garden at Buitenzorg in Java.

Rami novelli parce pilosuli, mox glabrescentes, cortice plumbeo nitido. *Folia* lanceolata circa 6 poll. longa, ½ poll. lata, primo subtus argenteo-pilosa, mox glaberrima, supra nitida, nervis lateralibus 9–11

angulo 50–60° ortis, petiolo crasso 2½ lin. longo. *Flores* extra-axillares interdum foliis oppositi, singuli vel bini, brevissime pedicellati; calycis lobi parvi, late triangulares, puberuli, decidui; petala exteriora majora, late ovata, 3½ lin. longa, marginibus subrevolutis viridia, parce pilosula, interiora subtriplo minora. *Carpella* 1–2, in fructu maturo ellipsoidea vel obovoidea, coccinea, 7½ lin. longa, stipite dimidio breviore. Semina singula, globosa.

22. **Synclisia delagoensis**, *N. E. Brown* [Menispermaceæ]; scandens, ramis retrorse pubescentibus cinereis, foliis petiolatis oblongis ellipticis vel elliptico-oblongis utrinque obtusis apice mucronatis 3–5 nervatis, supra glabris cum nervis impressis pubescentibus subtus sparse petiolisque dense pubescentibus, racemis brevissimis breviter pedunculatis axillaribus vel supra axillaribus 3–4 floris, floribus confertis breviter pedicellatis toto adpresse pubescentibus, bracteis subulatis, sepalis 2–3 seriatis, exterioribus 5–8 liberis anguste lanceolatis acuminatis, tribus interioribus in tubum breviter tridentatum connatis, petalis 6 biseriatis, minimis transverse oblongis subtruncatis glabris, staminibus circa 12 in columna toto conjunctis.

Habitat.—Near Lourenco Marques, Delagoa Bay, *Bolus* 7632!

Folia 1¼–3¼ poll. longa, ½–1¾ poll. lata; petioli ¼–¾ poll. longi. *Pedunculi* ⅛–⅙ poll. longi; pedicelli ½–1 lin. longi. *Sepala* connata 2½ lin. longa. *Petala* ⅓ lin. longa.

23. **Synclisia zambesiaca**, *N. E. Brown* [Menispermaceæ]; *S. delagoensi* similis, sed foliis magis ellipticis nervis utrinque prominentibus, floribus subminoribus, petalis dorso setoso-barbatis, staminibus circa 15–18 in columna conjunctis; drupa globosa pubescente, putamine osseo basi processu usque ad medium intruso, semine hippocrepiforme exalbuminoso.

Habitat.—Near Shupanga, and at Shiramba, Zambesi, *Kirk!*

Folia 1½–3 poll. longa, ⅝–1½ poll. lata; petioli ⅛–¾ poll. longi. *Pedunculi* masculi 1–2 lin. longi, feminei in fructu ⅛–⅓ poll. longi; pedicelli 1–2 lin. longi. *Sepala* connata 2 lin. longa. *Petala* ¼ lin. longa. *Drupæ* ½–⅝ poll. diam.

These two new species of *Synclisia* are readily distinguished from the only other known species of the genus (*S. scabrida*), by the leaves being entire at the base, and the stamens united into a distinct column. In *S. scabrida* the leaves are cordate and the filaments are nearly or quite free. In all the flowers of *S. zambesiaca* that I have examined I found at least some of the petals furnished with a few stiff hairs on the back near the apex, the hairs being as long as the petals themselves; but in *S. delagoensis* I failed to find any trace of such hairs. When the genus was founded by Bentham the female plant was unknown, and even now there are no specimens with female flowers at Kew, but a fruiting specimen of *S. zambesiaca* shows that the peduncles bear three or four flowers on short pedicels. The drupes are rather large and appear to have a rather thick fleshy mesocarp; the endocarp (putamen) is very hard, and ½–¾ of a line thick, being much thicker than in most other genera of the order Menispermaceæ.

24. **Anerincleistus Curtisii**, *Stapf.* [Melastomaceæ]; habitu *A. hirsuti*, Korth., sed floribus minimis in inflorescentia umbelliformi dispositis.

Hab.—Penang, *C. Curtis* (a. 1885), 412.

Rami juniores petioli et inflorescentia velutino-tomentosi. *Folia* inaequalia, majora oblonga, 2½–3½ poll. longa, 1–1½ poll. lata, basi rotundata subsymmetrica, acuminata, 3–5-plo-nervia, transverse venulosa, utrinque fulvo-setulosa, petiolo 2½–5 lin. longo; minora consimilia, 1¼–1¾ lin. longa, brevius petiolata. *Inflorescentiæ* ex axillis foliorum minorum, pedunculo gracili ¾–1 poll. longo suffultae, umbellatim cymosae, pauciflorae. *Calyx* globoso-campanulatus, vix lin. longus, strigoso-hirsutus, pilis capitato-incrassatis, dentibus brevissime triangularibus. *Petala* oblonga, appendiculo setiformi caudata, minuta. *Stamina* aequalia, filamentis in parte tertia superiore subgeniculatis, antheris obtusis, dorso inappendiculatis. *Ovarium* squamis obtusis vel crenulatis coronatum. *Capsula* globosa, ¾ lin. lata.

Dizygotheca,* *N. E. Brown.* [Araliacearum Genus novum] Calycis margo 5-dentatus. Petala 5, valvata. Stamina 5, filamentis crassiusculis; antheræ oblongæ, quadriloculares! Ovarium 10-loculare; styli 10, distincti, imprimis papilliformes, post antheras delapsas elongati. Fructus subglobosus vel ellipsoideus, baccatus; pyrenæ a latere compressæ, induratæ. Semen a latere compressum, albumine æquabili. Arbor parva. Folia digitatim composita. Umbella magna, composita, terminalis; bracteæ membranaceæ, caducæ. Flores hermaphroditi.

25. **Dizygotheca Nilssoni,** *N. E. Brown.* Glabra; caule simplici inermi, foliis digitatis, petiolis elongatis basi valde intumescentibus, foliolis 9–11 coriaceis longe petiolulatis elongato-oblongis, apice retusis vel emarginatis, basi plus minusve acutis, integris parum sinuatis subundulatis, umbellæ ramis primariis septem, medio quadriradiato apice decemradiato, umbellulis longe pedunculatis, floribus pedicellatis, petalis viridi-luteis, antheris albidis, baccis atroviolaceis.

Aralia Nilssoni, Linden Catalogue 1880, p. 54, name only.

Caulis 7–10 pedalis. *Petioli* 18–20 poll. longi; petioluli 2–3 poll. longi; foliola 9–13 poll. longa, 2–3½ poll. lata. *Umbella* circa 18–20 poll. diam., ramis primariis 8½ poll. longis; *pedunculi* 2–3 poll. longi; pedicelli ½ poll. longi. *Flores* ⅛ poll. diam. *Baccæ* ⅜ poll. diam.

This fine Araliad was received at Kew from Mr. Linden in 1880, and flowered for the first time in November 1891. Its native country is not stated, but very probably it came from one of the Pacific Islands. It is remarkable on account of its four-celled anthers, which character combined with its ten-celled ovary at once distinguish it from all other members of the order, of which the flowers are properly described.

26. **Trichocline (Ingenhousia) cordifolia,** *Baker* [Compositæ Mutisiaceæ]; perennis, acaulis, petiolis elongatis albo-tomentosis, foliis subcoriaceis cordato-ovatis denticulatis facie viridibus glabris nitidis dorso persistenter albo-tomentosis, pedunculo longissimo, capitulo semigloboso solitario, involucri bracteis pauciseriatis imbricatis adpressis valde inæqualibus dorso alboaraneosis, pappi setis perplurimis albidis ciliatis, ligulis parvis.

Rio Janeiro, *Glaziou* 17104, 18320.

Petioli pedales et ultra. *Folia* semipedalia. *Pedunculus* bipedalis et ultra. *Involucrum* 5–6 lin. longum. *Pappus* 3 lin. longus.

A very distinct species, nearest *T. Martii,* Baker in Fl. Bras. Vol. VI. pt. iii, p. 675.

---

* διζυξ double, θηκη, a receptacle, in allusion to the anthers having double the usual numbers of cells

27. **Trichocline (Ingenhousia) paraguayensis**, *Baker* [Compositæ Mutisiaceæ]; perennis, acaulis, foliis rosulatis oblanceolatis subacutis integris subcoriaceis in petiolum brevem sensim attenuatis facie viridibus glabris dorso persistenter albo-incanis, pedunculo stricto longissimo albo-tomentoso, capitulo magno solitario semigloboso, involucri bracteis pauciseriatis adpressis valde inæqualibus dorso albo-tomentosis intimis linearibus, pappo albo flexuoso, ligulis luteis magnitudine mediocribus.

Paraguay: sandy soil near Valenzia, *Balansa* 4693.

Folia 6–8 poll. longa, supra medium 15–18 lin. lata. *Pedunculus* 1–2 pedalis. *Involucrum* 6–7 lin. longum. *Pappus* 5–6 lin. longus. *Ligulæ* 3–4 lin. longæ.

Near *T. speciosa*, Less., D.C. Prod. VII. 20, from which it differs by its larger leaves, narrower involucral bracts and smaller ligules.

28. **Vitex (Chrysomallum) hirsutissima**, *Baker* [Verbenaceæ]; fruticosa, caule recto simplici gracili, foliis digitatim 5-foliolatis ad caulis apicem aggregatis petiolatis, foliolis magnis oblongis subsessilibus subcoriaceis utrinque breviter pubescentibus, apice obtusis emarginatis basi cuneatis, cymis compositis densis sessilibus axillaribus, ramulis, pedicellis calycibusque dense hirsutis, bracteis linearibus, calycis tubo campanulato dentibus angustis tubo subæquilongis, corollæ tubo infundibulari limbo bilabiato, genitalibus conspicue exsertis.

North Madagascar, *Baron* 6585.

Foliolum centrale 10–12 poll. longum, 6–7 lin. latum. *Calyx* 4 in. longus. *Corolla* 9–10 lin. longus.

A very striking plant, from its habit, very large horse-chestnut-like leaves and densely hairy flowers. In structure it is nearly allied to *V. Chrysomallum*, Steud.; Schauer in D.C. Prod. XI. 694 (*Chrysomallum madagascariense*, Petit Thouars).

29. **Æchmea (Hohenbergia) microthyrsa**, *Baker* [Bromeliaceæ]; acaulis, foliis longissimis ensiformibus ad apicem sensim angustatis utrinque lepidotis, basi dilalato oblongo, spinis marginalibus parvis castaneis, pedunculo elongato foliis pluribus lanceolatis magnis prædito, floribus in paniculam parvam densam aggregatis, ramis racemosis, pedicellis erecto-patentibus flore brevioribus, ovario oblongo parvo nudo, sepalis coriaceis oblongo-lanceolatis conspicue mucronatis, petalis parvis.

Rio Janeiro, *Glaziou* 18564.

Folia 3–4 pedalia, medio 1 poll. lata, basi dilatato oblongo 4–5 poll. longo. *Pedunculus* validus, bipedalis. *Panicula* 3–4 pollicaris, pedicellis circiter 3 lin. longis. *Sepala* 6 lin. longa.

Allied to *Æ. floribunda* Mart. (*Æ. organensis*, Wawra Itin. Prin. Sax., Cob., 146, tab. 23), from which it is easily recognised by its larger pedicellate flowers.

30. **Streptocalyx orthopoda**, *Baker* [Bromeliaceæ]; acaulis, foliis loratis subcoriaceis basi valde dilatatis obscure lepidotis apice rotundatis cuspidatis, spinis marginalibus corneis nigro-castaneis inferioribus crebris magnis superioribus sensim minoribus sparsioribus, floribus in paniculam amplam thyrsoideam dispositis ramis corymbosis, bracteis primariis parvis lanceolatis, pedicellis elongatis strictis, ovario oblongo nudo, sepalis coriaceis oblongo-lanceolatis mucronatis ovario longioribus, petalis parvis angustis.

Rio Janeiro, *Glaziou* 18565.

Folia bipedalia medio 12–14 lin. lata, basi dilatato oblongo 6–7 poll. longo, 4 poll. lato. *Panicula* pedalis, pedicellis inferioribus $1\frac{1}{2}$–2 poll. longis. *Calyx* (ovario infero incluso) 10 lin. longus.

Near *S. podantha*, Baker Handb., Brom. p. 32, another discovery of Dr. Glaziou's, from which it may easily be recognised by its broad thyrsoid panicle with corymbose branches, long erecto-patent pedicels, and oblongo-lanceolate sepals longer than the ovary.

CCLXII.—LAGOS PALM OIL.

(*Elæis guineensis*, Jacq.)

In the *Kew Bulletin*, 1891, p. 190, an account was given of the palm oil industry on the West Coast of Africa taken from the report of a Commission appointed in 1887 to consider the promotion of economic agriculture on the Gold Coast. As showing the importance and value of the palm oil as an article of commerce, the following note is taken from the *Journal of the Society of Arts* for March last, p. 407 :—

"The total import of palm oil into England is about 50,000 tons, valued at over 1,000,000*l*., but it is considered that this is an exceedingly small commerce compared to what might be the case were the enormous resources fully, or even moderately, utilised. For miles along the West Coast of Africa, extending between Cape Bianco and St. Paul di Loanda, there are vast forests of palms, the oleaginous fruit of which has, for centuries, rotted unused upon the ground. The oil palm forests at the back of the coast line of Cape Palmas and Elmina are said to be practically inexhaustible; and so also in the neighbourhood of Fernando Po, immense tracts are covered with the trees.

"Lagos furnishes the purest oil: for there are in commerce regular and irregular oils. When analysed, if the water and impurities exceed 2 per cent., an allowance is made; for often these oils contain 10 to 15 per cent. of water and impurities.

"Palm oil is eaten as butter by the natives, and used for anointing their bodies. Here it is used in the manufacture of soap and candles, and in South Wales in the preparation of tin plates. Its non-drying qualities render it valuable as a preservative of the surface of the heated iron sheet from oxidation until the moment of dipping into the bath of melted tin, the sheets being rapidly transferred to that from the hot oil bath, which consists almost entirely of palm oil.

"In 1871, as well as in 1880 and 1891, the imports of palm oil into the United Kingdom exceeded 1,000,000 hundredweight. From 10,000 to 15,000 tons of palm oil are shipped direct from Africa to the Continent. The price of the oil has ranged from 35*s*. per cwt., in 1883, to 23*s*. in 1890."

Reference is made in the above extract to the superior quality of Lagos palm oil. This fact was especially dwelt upon in the report of the Gold Coast Commission above mentioned, and a desire was expressed to obtain particulars of the method for preparing the oil in use in the former Colony. The same desire is expressed in the following letter addressed to Kew. The palm oil prepared in West Africa is extracted from the pericarp of the fruits. There is, however, another oil extracted from the kernels of the nuts. Usually these kernels are obtained by cracking the nuts by hand and shipping them to Europe, where the oil is usually expressed. The following letter refers in the first place to a useful machine that has been introduced to West Africa for extracting the kernels in an expeditious manner, and in the second place it asks for information respecting the special preparation of Lagos palm oil.

MR. G. A. MOORE to ROYAL GARDENS, KEW.

42, Tower Buildings, Liverpool,
2nd September 1891.

DEAR SIR,

MY attention has only just been called to an extract from the *Kew Gardens Bulletin* which was published in the *Liverpool Journal of Commerce* on the 21st ultimo, relating to the preparation of palm oil.

If you will read the enclosed prospectus it will give you some information about a machine [for extracting the kernels of palm nuts],

African Oil Palm.
(*Elæis guineensis*, Jacq.)

which I have now had in almost continuous operation in Brass River since 1878, and which does its work in the most satisfactory manner, provided the nuts are brought to it dry. The labour in connexion with it is only that necessary to bring the nuts to the feed, and carry away the shell and kernel when cracked. The latter are separated at once by taking advantage of their different specific gravities, which causes the kernel to float and shell to sink when dropped into brine of a certain density. Before shipment we winnow the kernels to get rid of any of the external coat or fibre which may get through the machine and float with the kernels in the bath, and also to dry them thoroughly.

There would appear to be nothing to prevent a large and growing business to be done with these machines in the Oil Rivers, as there the difficulty of carriage does not obtain, the country being canalised by nature to an extent unknown until a short time ago, even to the oldest traders.

* * * * *

I should be glad if you could give me any particulars of the "cold" process [for extracting palm oil] referred to as being in use at Lagos.

Yours, &c.
(Signed) G. A. Moore.

P.S.—One more remark I would like to add, viz., there would be no pecuniary gain in crushing kernels on the coast instead of here and on the Continent.

D. Morris, Esq., G. A. M.
Royal Gardens, Kew.

Royal Gardens, Kew, to Colonial Office.

Royal Gardens, Kew,
Sir, 4th September 1891.

I am desired by Mr. Thiselton-Dyer to inform you that an extract respecting the African oil palm (*Elæis guineensis*), taken from the report of the Commission appointed in 1887 to consider the promotion of economic agriculture on the Gold Coast, has appeared in the July number of the *Kew Bulletin* [1891, p. 190].

2. Attention is drawn in this extract to the superior quality of palm oil from Lagos, which is described as the purest known. It is mentioned that this superior quality may, in some measure, be due to the "cold" process of manufacture pursued at Lagos as opposed to the "hot" process pursued at the Gold Coast and other places.

3. The prominence given to the subject in the pages of the *Kew Bulletin* has led to inquiry being made at this establishment for details of the "cold" process pursued at Lagos for extracting palm oil. It is evident that such details would be of general value to people in this country interested in West African industries as well as to people in other parts of West Africa.

4. Under these circumstances Mr. Thiselton-Dyer would venture to suggest that an application be made to the Government of Lagos for an account of the palm oil industry as pursued in that Colony and especially in regard to the special process or processes there employed for extracting oil from the pericarp of the palm nuts.

5. On receipt of the information now desired Mr. Thiselton-Dyer would be glad to arrange for a summary of it to appear in the *Kew Bulletin*.

* * * * *

I have, &c.
The Hon. R. H. Meade, C.B., (Signed) D. Morris.
Colonial Office.

COLONIAL OFFICE to ROYAL GARDENS, KEW.

SIR, Downing Street, 16th January 1892.

I AM directed by the Secretary of State for the Colonies to transmit to you, for your information, with reference to your letter of the 4th of September last, a copy of a despatch from the Governor of Lagos, enclosing a report upon the preparation of palm oil, with five photographs, and also a report upon the extraction of fibre from the leaf of the oil palm.

I am, &c.

The Director, (Signed) ROBERT G. W. HERBERT.
Royal Gardens, Kew.

His Excellency G. T. CARTER to COLONIAL OFFICE.

MY LORD, Government House, Lagos, November 23rd, 1891.

IN reply to your Lordship's despatch, No. 183, of the 10th September, covering a communication from the authorities at Kew, asking for information in regard to the preparation of the palm oil as exported from Lagos, and also as to the extraction of fibre from the leaf of the oil palm,* I have the honour to inform your Lordship that I placed the matter without delay in the hands of Mr. Millson, the Assistant Colonial Secretary, who has taken much trouble to carry out my wishes.

2. I enclose herewith two reports from that officer giving clear details as to both processes which I trust will be useful.

3. The photographs which so well illustrate the process of separating the oil from the fibrous nut, were taken by Mr. Haddon Smith to whom the thanks of the Government are especially due. . . . . .

I have, &c.

The Right Hon. Lord Knutsford, (Signed) G. T. CARTER,
&c. &c. &c. Governor.

NOTES on the preparation of LAGOS PALM OIL.

The chief flowering season of the Oil Palm (*Elæsis guineensis*), (Yoruba name Igi okpwe) in the neighbourhood of Lagos is during the September and October rains, the second and lesser rainy season of the year. The fruit takes from four to five months to develop, the main-crop coinciding with the Harmattan or desert wind, which blows in the months of December and January from the Sahara to the sea.

This dry and cold wind is supposed by the natives to assist in ripening the fruit, and they have a saying that a strong Harmattan brings plenty of palm oil. Experience, however, tends to show that heavy rains during the flowering season have a more decided influence upon the crop.

During the months of February, March, April, and May the palm trees are in full bearing and the main crop of the year is gathered. The waterways are then busy with flotillas of trading canoes, the lagoon

---

* Oil palm fibre is discussed is the *Kew Bulletin* for March 1892, p. 62, with woodcuts.

Preparation of Lagos Palm Oil. (Boiling Process.)

sides gleam with fires and the hoarse songs and shouts of the natives at work are heard throughout the night.

The trees continue to bear small quantities of fruit during the remaining months of the year, but the amount of palm oil produced for shipment is comparatively small.

In order to gather the fruit the trees are climbed with the help of two stout ropes which are passed round the stem and serve as a support to the worker. By one of these the tree and the waist of the climber are loosely encircled, leaving the body room for considerable freedom of movement. At both ends of the other rope are loops, through the larger of which the left leg is passed to the thigh, while the right foot rests in the smaller loop. This rope is somewhat shorter in proportion than the body rope. By this means a sort of cradle is formed in which the climber rests by the weight of his reclining body and the pressure of his feet against the stem. The waist rope is held in the hands and jerked upwards against the tree. The body is then thrown backwards so as to put a full strain upon this upper rope, while the feet are planted firmly against the tree and worked alternately upwards, carrying the lower rope with them.

In this way a man can walk up a palm tree with great rapidity and ease, and on arriving at the top can move both hands freely, while leaning back comfortably on his ropes. The rough, scaly excrescences on the stem of the Oil Palm [bases of old leaves] keep them from slipping down though they offer no resistance to their upward movement.

The "hands" of fruit (Yoruba, Idi okpwe) are cut with a small native hatchet, with a narrow triangular blade, and are trimmed and cleaned with a cutlass.

They are then put in a heap and are covered with a thin layer of palm leaves, and left to stand for a period varying from four to ten days until fermentation sets in. Care is taken that this process (called in Yoruba "On she basha") should not continue for too long. As soon as the nuts become loose in their sockets they are removed by hand, and put into baskets. In order to be able to pick them out more easily the "heads" are cut into small pieces with a cutlass.

A hole is then dug with a channel leading to it, and a large earthenware pot holding about 11 gallons is placed upon bricks which are balanced on the edge of the hole. By this means a thorough draught and an equal distribution of heat is secured.

Boiling process (Yoruba—On se engiu).—The bottom of the pot is plastered to an inch and a half in thickness with a mixture of wood, ashes, and water, the object being to secure a steady heat, which could not otherwise be obtained with irregular firing.

Five or six double handfuls of dried palm kernel shells are then thrown into the hole, fire is made with the dried refuse of the pericarp of the nuts, and logs of wood about the thickness of a man's wrist are used as fuel.

About 56 pounds of palm nuts (Yoruba for palm nut, Enyin) are put in the pot and covered with water. They are then boiled for an hour and a half or two hours, until the pericarp is soft enough to be squeezed easily between the fingers. A little water is added from time to time during the boiling process in order to keep the nuts covered. No oil exudes during this process.

Mashing process (Yoruba—On te enyin).—When considered to be sufficiently softened, the nuts are strained in baskets, and put into a canoe which has been hauled up out of the water for the purpose. They are then trodden with the bare feet by natives who support themselves on

two sticks as they stamp heavily backwards and forwards in the canoe, pressing with a peculiar twisting motion of the feet so as to strip the pericarp from the kernels. The feet are carefully washed both before and after the treading process.

In this manner it takes 45 minutes for three men to tread two hundredweight of nuts.

Washing process (Yoruba—On she epol'owo).—Cold water is then poured into the canoe to a depth of 3 or 4 inches above the pounded mass, a portion of the canoe about a third of its length being dammed off for this purpose by the material in process of being washed.

The fibre of the bruised pericarp is stirred up in the water with the hands, grasped in handfuls, separated from the kernels, shaken to and fro with a switching motion in the water, thoroughly squeezed and thrown aside into baskets.

While this is going on the water is ladled up and poured rapidly from a height out of calabashes back into the canoe. The remaining fibre is separated from the kernels and sieved out by sidelong blows of a small basket. Neither the fibre nor the kernels float on the surface.

After a short time the water in the canoe becomes covered with a thick gamboge-coloured scum, which is driven together by agitating the surface of the water with the fingers, and is skimmed off with the double hands into a floating calabash. This scum contains the oily particles which have been set free from the bruised pericarp. It is of the consistency of thick cream, and is full of minute air bubbles. As the water in the canoe gets muddy, with a peculiar dirty greenish tinge, it is thrown out and fresh water is added.

This process is repeated until the whole of the material has been thoroughly washed. The fibre is then placed in a mortar and beaten, and afterwards washed again, after which it is pressed into balls with the hands and put in the sun to dry.

Of this dried fibre I forward a specimen which may possibly prove of some value at home. The only use for it here is as tinder and in making fires.

The kernels are placed in baskets, and afterwards dried in the sun and cracked between stones for export as "palm-kernels," over 37,000 tons of which are annually shipped from Lagos. The kernel shells are used for firing and are made into blacksmiths' charcoal.

The oil is now ladled out of the pot into which it has been skimmed, and is placed in another pot on the fire. About one-eighth of its bulk of water remains in the pot in which it has been standing.

Clarifying process (Yoruba—On se epo). While the crude oil is being clarified by boiling it is carefully sieved by passing a small basket through it so as to remove all fragments of fibre. By this means also it is kept well stirred. Considerable care has to be used in regulating the fire so as to avoid excessive heat. After boiling for about half an hour the oil is seen to turn almost blood-red, while the water upon which it floats is of a yellowish green colour.

The oil is now carefully skimmed off, and strained through a small basket into an earthenware pot. After standing in this for a few minutes it is again skimmed with a small calabash into a five-gallon jar in which it will eventually be sent to market. As the water begins to show in the lower portion of the oil, it is submitted to a further process of boiling, and is skimmed again.

The whole process of palm-oil making, from the boiling of the nuts to the final skimming of the oil takes from 8 to 14 hours, according to the quantity dealt with and the number of persons employed.

PREPARATION OF LAGOS PALM OIL. (WASHING PROCESS.)

It is usual to begin work at about 4 o'clock in the afternoon and to work all night, washing and skimming the oil in the cool of the morning.

From careful experiments carried out under my supervision I find that two hundredweights of palm nuts give exactly two imperial gallons of oil, or an average of a gallon a hundredweight.

As an average yield of an hundredweight to five trees is considered a fair crop, counting male and barren trees, it would appear that to produce the 3,000,000 gallons of palm oil annually exported from Lagos, no less than 150,000 tons of palm nuts are each year gathered from 15,000,000 trees.

Every stage in the manufacture of Lagos oil is marked by great care and cleanliness, and the result is a remarkably pure sample of oil.

(Signed) Alvan Millson,
Assistant Colonial Secretary.

CCLXIII.—NEW ORCHIDS: DECADE 3.

21. **Pleurothallis stenosepala**, *Rolfe*, *n. sp.*—Caules graciles, circa 5–6 poll. longi. Folia cordato-oblonga, acuminata, 3 poll. longa, 1¼ poll. lata. Flores sæpissime solitarii, axillares. Sepalum posticum patens, subulato-lineare, attenuatum, 10–11 lin. longum, 1½ lin. latum, dorso carinatum. Sepala lateralia omnino connata, basi 2½ lin. lata, cæteris sepalo postico similia. Petala patentia, subulata, 2 lin. longa. Labellum cordato-oblongum, subobtusum, carnosum, muriculatum, subtus infra apicem minute tuberculatum. Columna brevissima.

A species belonging to Lindley's group *Macrophyllæ fasciculatæ*, and allied to *P. Cardium*, Rchb. f., but differing in its much longer and narrower sepals, which, as well as the petals, are light green in colour. The lip is of a light brownish-buff shade. It has flowered in the Kew collection on several occasions, and has recently been sent for determination by R. J. Measures, Esq., Cambridge Lodge, Flodden Road, Camberwell.

22. **Lepanthes gracilis**, *Rolfe*, *n. sp.* — Caules graciles, angulati, hispiduli, 1½–2½ poll. longi; vaginarum limbus ovatus, mucronatus, denticulatus. Folia elliptica, mucronata, ¾–1¾ poll. longa, 5–8 lin. lata. Racemi foliis breviores, 1–1¼ poll. longi, distichi. Bracteæ conduplicatæ, late triangulo-ovatæ, acutæ, ¾ lin. longæ. Pedicelli medio articulati, 1½ lin. longi. Flores 2½–3 lin. longi. Sepala ovata, acuta, 1½ lin. longa, lateralia semilibera. Petala obliqua, oblonga, obtusa, basi in auriculam lineari-oblongam laminam fere æquantem extensa, 1 lin. longa. Labelli unguis columnæ adnata, limbus hippocrepiformis, apice acute bilobus, lobi laterales reflexi, acuti. Columna brevissima.

This little species has recently flowered in the Kew collection, but nothing is known of its origin. It belongs to the section *Distichæ*, and is allied to *L. concinna*, Sw., which, however, is a considerably larger plant. The present species has bright yellow sepals, deep yellow petals, usually with a maroon-purple border on the inner side, a yellow lip, and dull purple column.

23. **Restrepia dentata**, *Rolfe*, *n. sp.*—Planta cæspitosa, parva, caulibus brevibus. Folia ovato-oblonga, obtusa, minute tridenticulata, carnosa,

circa 1¼ poll. longa, ¾ poll. lata. Pedicelli graciles, 1½ poll. longi. Bractea 1½ poll. longa, carinata. Sepalum posticum 6½ lin. longum, infra medium concavum, lanceolato-lineare, dein aciculare, apice crasso-clavatum. Sepala lateralia semiconnata, 6 lin. longa, linearia, obtusa. Petala 4 lin. longa, infra medium lanceolata, dein acicularia, apice crasso-clavata, supra basin utrinque unidentata. Labellum 2 lin. longum, pandurato-oblongum, truncatum, supra medium muriculatum, supra basin utrinque falcato-setaceum. Columna clavata, incurva, 1½ lin. longa.

A very distinct little species which has flowered in the Glasnevin Botanic Garden on several occasions, and been sent to Kew for determination. It has a very marked peculiarity in the presence of a pair of slender, stipule-like teeth on the petals, one on either side, about the middle of the lanceolate basal portion, and these are decurrent below their free apex. The dorsal sepal and petals are semi-transparent white, with three purple lines, the decurrent teeth of the latter being yellow. The lateral sepals are dull yellow, nerved with brownish purple below, and the lip brownish purple with the falcate side lobes deep yellow. Mr. Moore is unable to state its native country, though in all probability it comes from some part of the Andes.

24. **Cœlogyne flexuosa**, *Rolfe*, *n. sp.*—Pseudobulbi approximati, conico-ovoidei, subtetragoni, 2¼–2½ poll. longi, 1 poll. lati, diphylli. Folia oblanceolata, acuta, basi attenuata, 8–11 poll. longa, 1¼–1¾ poll. lata. Scapus terminalis, gracilis, foliis æqualis, racemo circa 13-floro flexuoso, floribus distichis. Bracteæ deciduæ, oblongo-lanceolatæ, acutæ, ¾–1¼ poll. longæ. Pedicelli graciles, ½–¾ poll. longi. Ovarium acute hexangulatum v. fere hexapterum. Sepalum ovato-oblongum, subobtusum, acute carinatum, 7 lin. longum, 3–3½ lin. latum. Petala linearia, subobtusa, 1¼ lin. lata. Labellum trilobum, basi transversim angustissime constrictum, lobis lateralibus erectis apice rotundatis, lobo medio elliptico-oblongo obtuso, disco tricarinato, carinis vix undulatis. Columna clavata, angulis anguste marginatis.

The present species is a member of Lindley's group *Flexuosæ*, and is allied to *C. simplex*, Lindl. and *C. suaveolens*, Hook. f. From the former, however, it is readily distinguished by its sharply hexangular ovary, broader petals, and the more slender keels of the lip; from the latter by the narrower petals and the straight, not very undulate, keels of the lip; and from both by its habit of producing the scapes from the summit of the nearly mature pseudobulbs between the leaves, not from the young growths. It is a native of Java, and was presented by the Botanic Garden at Leyden to the Kew collection, where it flowered in April of the present year. It was also received from Mr. F. W. Moore, Glasnevin Botanic Garden, Dublin, as a Javan species, as long ago as May 1889, when it could not be determined. The flowers are white with a light yellow stain across the middle of the lip, which is extended as a narrow line on either side of the disc to near the base, at which point the lip is very sharply constricted, producing a narrow transverse channel underneath.

25. **Epidendrum bituberculatum**, *Rolfe*, *n. sp.* — Caules erecti, graciles. Folia linearia, subobtusa, 2¼–3 poll. longa, 3–4 lin. lata. Racemus corymbosus, demum elongatus. Bracteæ ovatæ v. ovato-lanceolatæ, acutæ, ½–1½ lin. longæ. Pedicelli 9 lin. longi. Sepala late lanceolata, acuta, 3½ lin. longa; lateralia subobliqua. Petala paullo angustiora. Labellum trilobum, fimbriatum, lobis lateralibus rotun-

datis, lobo medio bilobo, disco carinato basi bicalloso. Columna clavata.

This species belongs to Lindley's group *Schistochila carinata*, and is allied to *E. Schomburghii*, Lindl., though a smaller and more slender plant, with smaller rosy-purple flowers, resembling *E. elongatum*, Jacq., in colour. The calli at the base of the lip are yellow. It was sent to Kew for determination by Sir Trevor Lawrence, Bart., M.P., of Burford Lodge, Dorking, in February 1890, and again during the present year. Its habitat is not recorded.

26. **Maxillaria glumacea**, *Rolfe*, *n. sp.*—Pseudobulbi oblongi, compressi, ancipites, 4 poll. longi, 1½ poll. lati, monophylli. Folia elongato-linearia, 1½ ped. longa, 1½ poll. lata. Scapi erecti, 4 poll. longi, vaginis imbricatis tecti. Bracteæ convolutæ, acutæ, 1¼ poll. longæ. Sepala glumacea, oblongo-lanceolata, concava, apice acutissima, rigida, 1¼ poll. longa. Petala linearia, acuta, 1 poll. longa, 1¼ lin. lata. Labellum obscure trilobum, 8 lin. longum, 3½ lin. latum, lobis lateralibus angustis, lobo medio triangulato-lanceolato acuto apice rigido incurvo, callo lineari carnoso nitido. Columna clavata, 5 lin. longa.

A species allied to *Maxillaria aciantha*, Rchb. f., and *M. coriacea*, Rodr., recently introduced from Brazil by Messrs. F. Sander & Co., of St. Albans, with whom it flowered in June of the present year. The glume-like very acute and rigid sepals are of a dull yellowish-green, as are also the petals. The lip has dull maroon-purple side lobes, while the front lobe is deep blackish-brown, with yellow margin and apex, and the fleshy linear callus of a shining purple-brown. The short scapes are clothed with about four or five loose imbricating sheaths.

27. **Aspasia Barclayi**, *Rolfe*, *n. sp.*—Pseudobulbi elliptico-oblongi, subcompressi, ancipites, 1½ poll. longi, ¾ poll. lati. Folia oblongo-linearia, acuta, 6 poll. longa, 7–9 lin. lata, pallide viridia. Racemi breves, pauciflori. Bracteæ ovatæ, acutæ, 2 lin. longæ. Pedicelli 9–12 lin. longi. Sepala patentia, elliptico-oblonga, subacuta, basi subattenuata, 8–9 lin. longa. Petala sepalis similia. Labellum sessile, late pandurato-oblongum, emarginatum, 8 lin. longum, prope basin 7 lin. latum, prope apicem paullo angustius, disco bicarinato. Columna clavata, 8 lin. lata.

A small species sent to Kew for determination by W. L. Barclay, Esq., The Briars, Reigate, in July 1891. It is allied to *A. Principissa*, Rchb. f., and *A. psittacina*, Rchb. f., though its flowers are much smaller, and otherwise different. The sepals and petals are of a very pale yellowish-green, with broad transverse light olive-green bands, and the lip white, with some nearly confluent light purple markings in front of and beside the keels, and a pair of small yellow markings at the extreme base. In addition to the two central keels there are three or four obscure radiating ones on either side at the extreme base of the lip. Its habitat is not recorded.

28. **Oncidium cristatum**, *Rolfe*, *n. sp.*—Pseudobulbi ovoidei v. ovoideo-oblongi, subcompressi, 2–3 poll. longi, 1¼–1¾ poll. lati. Folia lineari-lanceolata, acuta, 4–6 poll. longa, ¾–1 poll. lata. Scapi 4 ped. alti, scandentes v. subvolubiles, apice ramosi, ramis laxifloris. Bracteæ ovato-lanceolatæ, acutæ, 1½ lin. longæ. Sepala reflexa, unguiculata, lineari-oblonga, obtusa, undulata, lateralia 8 lin. longa, posticum paullo breviora. Petala reflexa, breviter unguiculata, oblonga, obtusa, undulata, 6 lin. longa. Labellum pandurato-trilobum, lobo medio amplo orbiculari-reniformi retuso 6–8 lin. lato, lobis lateralibus parvis orbiculari-oblongis

1 lin. latis, crista quinquilamellata lamellis crenulato-cristatis. Columna brevis, alis falcato-oblongis obtusis crenulatis fere 2 lin. longis.

A distinct and pretty species introduced from Brazil by Messrs. Linden, L'Horticulture Internationale, Brussels, which flowered in April of the present year, and was sent to Kew for determination. It is allied to *O. schillerianum*, Rchb. f., and *O. Volvox*, Rchb. f., with which it agrees in its somewhat twining scape. The sepals and petals are reflexed, undulate, and of a clear bright yellow, the lip a little deeper yellow with a row of suffused red-brown dots on either side of the crest, and the column-wings deep yellow. The crest consists of five parallel cristate-crenulate keels, the two outer ones being longer, and the two next considerably shorter than the middle one.

29. **Cypripedium pusillum**, *Rolfe*, *n. sp.*—Caules nani, pubescentes, diphylli. Folia opposita, late elliptico-oblonga, obtusa, membranacea, puberula, 2–2¾ poll. longa, 1¼–1¾ poll. lata. Flores terminales, parvi, in racemum abbreviatum corymbiformem pauciflorum dispositi. Bracteæ lanceolatæ, acutæ, glabræ, 5–8 lin. longæ. Ovarium glanduloso-pubescens, 4–5 lin. longum. Sepala subpatentia, ovato-lanceolata, acuta, 6–7 lin. longa, lateralia fere omnino connata. Petala sepalis similia. Labellum parvum, 4 lin. longum, oblongo-globosum, ore semicirculare. Columna brevis, staminodio trulliformi-ovato, stigmate ovato.

This is a curious little species, closely allied to *Cypripedium fasciculatum*, Kellogg, a native of California and Oregon, being in fact the only other member of the section *Diphyllæ* with racemose flowers. The present species, however, is a much smaller plant in every respect, barely exceeding 4 inches high. The flowers are light yellow, longitudinally veined with dull brownish-purple, with a light yellow lip; they become more purple as they fade. The infolded margin of the lip, which is strongly infolded round the mouth, is at the base suddenly turned out and reflexed. A plant was purchased for the Kew collection in May last, without any record of its origin, but shortly afterwards it was sent for determination by H. J. Elwes, Esq., of Cirencester, who had received it with the information that it came from Florida. It has also flowered with Messrs. F. Sander & Co., of St. Albans.

30. **Cypripedium Henryi**, *Rolfe*, *n. sp.*—Planta circa 2 ped. alta. Caules pubescentes, foliosi. Folia elliptico-oblonga v. late elliptica, acuminata, plicata, 4–8 poll. longa, 1–4 poll lata. Racemi 2–4 flori. Bracteæ ovato-lanceolatæ, acuminatæ, 1½–2 poll. longæ. Ovarium dense glanduloso-pubescens. Sepalum posticum lanceolato-ovatum, acuminatissimum, 1½ poll. longum, ½ poll. latum. Sepala lateralia fere omnino connata, apice bifida, sepalo postico æqualia. Petala linearilanceolata, acuminatissima, sepalis paullo longiora. Labellum inflato-calceolatum, ¾ poll. longum. Staminodium late obovato-oblongum, subacutum.

China: Prov. Hupeh and Szechuen; Dr. Aug. Henry, n. 5391.

A very distinct species of the section *Foliosæ*, allied to the Himalayan *C. cordigerum*, Don, but with flowers in racemes and many other differences. The colour of the flowers has not been recorded, but judging from what can be seen in the dried state may be greenish-yellow, with a somewhat paler lip.

CCLXV.—SOME VANILLAS OF COMMERCE.

In the *Kew Bulletin* 1888, p. 76, an account was given, with a plate, of the Vanilla plant. It was pointed out that, with the exception of Mauritius and the Seychelles, a vanilla industry had not assumed an important position in any British colony. Since 1888, however, a very successful attempt has been made to start a vanilla industry in the Fiji Islands. Samples of Fiji Vanilla were received in this country last year, and they were very favourably received. As indicating the importance of the world's production of Vanilla, the following paper, prepared by Dr. Beringer and published in the *America Journal of Pharmacy*, is reproduced from the *Pharmaceutical Journal*, July 2, 1892 :—

While the home of the vanilla is Mexico and South America, its cultivation, originally greatly encouraged by the French Government, has been extended by individual enterprise, till now the plant is cultivated in numerous and widely distributed countries; as, for instance, the West Indies and some of the islands of the Indian and Pacific oceans, the essentials being a mean temperature of 75° to 80°, and sufficient moisture, at least during certain seasons of growth. In a circular issued in 1890, Mr. Hires described the vanilla plant as a *parasite*, stating that "it takes its life and sustenance from the Mexican red " cedar, which abounds in that country." This error is being repeated, and singularly such an authority as the *Encyclopædia Britannica* states " the plant has a long, fleshy stem, and attaches itself by its aërial root- " lets to trees, and appears to be little dependent upon the soil for its " nourishment." While epiphyte in its character, clinging to forest trees for support, it is not parasitic, obtaining its support principally through its aërial roots, which drop to the ground, and in many of the cultivations in the islands of the Indian Ocean the plants are supported for a considerable length upon rude trellises.

The products of the Java vanilla cultivators are exported to Holland and do not reach this country. The varieties entering our markets being the Mexican, Bourbon, Seychelles, Mauritius, Tahiti, South American, and Vanillons, with occasionally a few pounds of unknown origin brought in by trading vessels. The products of Mauritius and the Seychelles are usually shipped to London; while those from the French possessions, Réunion, Tahiti, Mayotte, &c., go to France.

U. S. Consul Horace G. Knowles, of Bordeaux, reports (*see* U. S. Consular Reports, September 1891, 127, as follows :—" Paris, London, " and New York are the markets of the world for vanilla. The greater " portion imported into France comes from her colonies, Guadaloupe, " Madagascar (Saint Marie), Mayotte, Réunion, and Tahiti. Just " what the products have been may be judged from the following " table :—

——	Réunion.	Guadaloupe.	Mayotte.	Sainte Marie.	Tahiti.
	lbs.	lbs.	lbs.	lbs.	lbs.
1880	164,289	—	—	—	—
1885	155,548	9,532	2,640	8,800	18,350
1886	361,587	12,100	4,774	18,260	5,500
1887	417,230	6,820	2,596	16,610	6,600
1888	462,660	9,044	19,195	19,195	6,490
1889	506,462	—	—	—	7,018

Mexican Vanilla.—The finest vanilla is still produced in Mexico, where it has been cultivated for nearly a century. Mr. C. E. Hires (*loc. cit.*), states that the pods are collected in the fall, November or early December, when nearly mature; the processes of curing, sorting, and packing requiring from four to five months, the crop of this year reaches the market in the spring and summer of the next. The erroneous statement is still made in the U. S. Dispensatory that the fruit is collected in the spring. This is the time of flowering, but according to all authorities it will require nearly six months for the fruit to be perfected. Since the extensive cultivation of vanilla in Réunion and other French provinces, the exportation of the Mexican to France has rapidly declined. At the present time, the United States afford the principal market for this product. The receipts for recent years were as follows:—

—	Cases.	Lbs.
1885 - -	806	100,750
1886 - -	605	75,625
1887 - -	1,023	127,875
1888 - -	829	103,625
1889 - -	852	106,500
1890 - -	947	118,375
1891 - -	1,087	135,875

The crop of 1890–1891 was the largest ever grown. Prime Mexican vanilla is from 8 to 10 inches long, flattened, and about $\frac{3}{8}$ inch in diameter at the broadest part. Its upper end or end of attachment tapers gradually for about one-quarter the length of the pod, and is usually curved and slightly twisted toward the point. The lower end is but very slightly attenuated. The colour is a dark brown, and the odour is pleasant, aromatic, and characteristic. The surface is ridged longitudinally, the ridges being interspersed with finer striations and warty excrescences. The pod feels firmly plump, and while fresh the surface is somewhat viscid; but, nevertheless, there is a roughness to the touch, which becomes more pronounced as it gets older and drier. Acicular crystals commence to form at the ends and gradually extend over the surface. The interior is filled with numerous small black seeds and a small quantity of pulp.

Bourbon Vanilla.—The cultivation of vanilla in Réunion was commenced nearly half a century ago, and has been steadily on the increase until now probably 3,000 acres are under cultivation. In 1849 only 3 kilogrammes were exported from Réunion, in 1861 this had been increased to 40,000 lbs., and in recent years has not fallen below 200,000 lbs. The quality of the Bourbon vanilla has likewise undergone considerable improvement, so much so that many of the published descriptions in the text-books do not fairly describe the product in our markets to-day. The best qualities are from $7\frac{1}{2}$ to $8\frac{1}{2}$ inches long, and $\frac{1}{4}$ to $\frac{5}{16}$ inch in width at the broadest part. The lower end is but slightly attenuated, and the upper gradually tapers, commencing about $1\frac{1}{2}$ to 2 inches from the point, and is twisted and turned in. In size and general appearance they closely resemble the Mexican, and are now packed in bundles closely simulating that variety. In colour they are of a dark brown, almost black. The odour is not unpleasant, but is unlike the Mexican, being more like that of Tonka. The difference in odour becomes very pronounced on steeping a piece in hot water. The surface

is longitudinally wrinkled, the striations being coarse and deep. To the touch the *surface is smooth and waxy*, and soon *becomes covered with a coating of acicular crystals*, known in the trade as "*frost*." It is not as firmly fleshy as the Mexican. The vanillas from the Seychelles and Mauritius are commonly sold in this country as inferior Bourbon. The total imports of the three varieties in 1891 amounted to about 10,000 lbs.

Vanilla from the Seychelles and Mauritius.—These varieties are very similar in character. Samples of Seychelles examined were 6 to 6½ inches in length, not much flattened, being in many instances nearly round and only $\frac{3}{16}$ to ¼ inch in width, tapering for about 1 to 1½ inches to the upper end, which is generally twisted. The longitudinal ridges are broad and flattened. It is characterised by its pale colour, faint odour, and small size. After a time a few crystals appear on the surface, which is smooth, but not as waxy as that of the Réunion vanilla. These crystals frequently assume a flat or tabular form.

The Mauritius fruit is similar to the Seychelles in colour, shape, and surface characters, but is generally somewhat smaller.

South American Vanilla.—Recently the quantity of South American vanilla imported has been quite large. In 1891 it amounted to about 9,000 lbs. The principal outlet is most likely as an adulterant of the Mexican cut beans, as in this form it becomes a dangerous adulterant. In the entire bean the difference is easily recognised. It is from 6½ to 7½ inches in length and quite broad and flattened, being usually ½ inch or more wide, slightly tapering at the lower end, and at the upper quite sharply attenuated an inch or so from the point. The colour is of a reddish-brown and the odour is rank, resembling somewhat that of fermented molasses or rum. It is *very pulpy* and extremely resinous. The surface is distinctly wrinkled and smooth, being intermediate in feel between the Bourbon and the Mexican.

The pods appear to be collected when nearly ripe; frequently they are split and seeds are seen all over the surface. There are but few crystals appearing on the surface. Transverse sections showed the pericarp to be very thin at the edges and to consist largely of broken down, dark reddish-brown cells.

Tahiti Vanilla.—The vanilla produced in the island of Tahiti and in the Sandwich Islands is all sold under the name of Tahiti vanilla. It is largely consumed on the Pacific Coast and in the Western States. Some years ago a considerable quantity was disposed of in Philadephia among the retailers, being offered as *transplanted Mexican*.

The imports in 1891 amounted to 5,000 lbs. They are 6 to 7 inches long, broad and flat, about ⅜ to ½ an inch in width. The colour, odour, and external marking are similar to the South American. They taper for a short distance to the lower end, and are sharply attenuated and twisted toward the upper end. They are likewise very pulpy.

Vanillons.—While some few wild or uncultivated vanillas are collected in Mexico, the bulk of those entering commerce are obtained from the West Indies, Guadaloupe and Martinique being the principal places of export. Their principal consumption is among the tobacco manufacturers, and perfumers, for the manufacture of sachet powders.

They are from 4 to 5 inches in length, ⅜ to ¾ or even 1 inch in diameter, frequently sharply angled, exhibiting almost a triangular shape on cross-sectioning. They are nearly the same diameter for the greater

portion of their length, being attenuated at both ends. They are brown to a red-brown in colour and longitudinally rigid. The transverse markings, due to their being wrapped with twine during the process of curing, give them a curious twisted appearance. They are generally split open and lack almost entirely the odour of vanillin, their odour being compared to a cross between a fermented sugar and heliotrope odour. They are devoid of any crystalline efflorescence.

CCLXVI.—MISCELLANEOUS NOTES.

The Museum of the Royal Gardens contains numerous illustrations of the applications of Cork, the bark of the Cork Oak (*Quercus Suber*, L.). The tree grows in Spain, Italy, South of France, and Algeria, and the first crop of cork is taken from the trunk as it stands, at the age of about 30 years, and afterwards at intervals of from six to 10 years. The later crops furnish the best bark, which is used for bottle corks and similar purposes. The Museum collection has just been made more complete by the addition of an axe, scraper, and knife, such as are used in collecting cork in Algeria. These have been presented by Mr. Vice-Consul Scratchley, of Philippeville, Algeria.

Samples of Annatto Seeds and Annatto Dye from *Bixa Orellana*, L., have recently been received from E. H. Man, Esq., grown and prepared in the Andaman and Nicobar Islands. The seeds were of a bad colour, and the so-called dye apparently consisted of the coloured portion of the seed reduced to powder, five ounces of which were obtained from one pound of seeds. Upon submitting these samples to Messrs. Fullwood and Bland, the well-known annatto makers, they reported that both the seeds and prepared dye were valueless in the English market. The fact is, Ceylon now supplies annatto dye of such excellent quality that other countries can scarcely compete with it, except when prices are exceptionally high.

In consequence of the great demand for Gutta Percha, any new substance of a similar nature is looked upon with keen interest. A specimen of Gutta, obtained from *Dichopsis obovata*, C. B. Clarke, has been received at Kew from Mr. H. M. S. Mathews, Officiating-Director of Land Records and Agriculture, Burma. The Gutta was obtained from the Tenasserim Division, in the southern part of which the tree is said to occur in considerable numbers. The sample received at Kew weighed 26 ounces, and is the produce of one tree. It was thought that if the substance was found to be of fair market value, a trade of some importance might be established in it. Upon submitting the sample in question to Messrs. Hecht, Levis, and Kahn, of London and Liverpool, they reported as follows:—"This is not real Gutta Percha. The sample "contains a large quantity of gum which renders it almost valueless, we "do not think that it would be worth more than one penny, or at the "outside three-halfpence, per pound. It is very brittle."

In the *Pharmaceutical Journal* for July 23rd, 1892, p. 61, Mr. Leonard Wray, Junior, Curator of the Perak Government Museum,

gives an elaborate account of the Malayan fish poison, known as "AKER TUBA," and furnished by the roots of *Derris elliptica*, Benth. To prepare it for use, the roots are pounded or ground into a fine powder and mixed with stiff clay and crushed refuse, such as shrimps or small fish. This mixture is made into balls and dried, and these balls are thrown into the sea like ground bait. In the rivers the Malays take one or more dug out canoes, according to the size of the stream to be operated upon, and partly fill them with water and pounded roots. The boat or boats are then upset into the river and drift down with the stream, whilst with nets and spears they secure the fish as they rise stupefied to the surface. Mr. Wray says that the root is also largely used by the Chinese market gardeners as an insecticide, for which purpose the fresh roots are finely chopped and pounded and mixed with water, which becomes milky, and this is sprayed or brushed over the plants with a bunch of feathers. It is said that 20 grains of the green root will render one gallon of water sufficiently poisonous to kill fish. The plant was referred to in the *Report of the Royal Gardens, Kew*, for 1877, p. 43, and is at present growing in the Economic House. The dried roots are shown in the Museum No. I.

Mr. F. M. Bailey, F.L.S., the Colonial Botanist at Brisbane, has recently sent to the Kew Museum some sporocarps of the NARDOO (*Marsilea Drummondii*, A. Br.), and cakes made from them by the natives of the Diamantina district. This species is described in the *Flora Australiensis*, vol. vii., p. 684, as yielding "a miserable article of food under the name of *Nardco*." It will be remembered that the "Nardoo" formed the only food for some time of the unfortunate Australian explorers Burke and Wills. Mr. Bailey says in the letter accompanying the specimens:—"I have just received from Dr. T. L. Bancroft some "samples of Nardoo 'damper' or cakes, made by the natives of the "Diamantina district; I send a few with some of the seeds under separ- "ate cover. The following is the mode adopted in making the cakes or "dampers:—The 'gins' (women) take a handful of the seed and let "two or three at a time drop through the third or fourth fingers on to "a flat stone, then in the other hand they have a stone with which they "beat the seed until it is reduced to a yellow powder, this runs down a "piece of bark into some utensil, when sufficient quantity is obtained "it is mixed with a little water and baked."

POISONOUS LEGUMINOUS PLANT.—Amongst the numerous seeds, fruits, and products that are constantly being received at the Royal Gardens for identification were a few pods with bright-red seeds, which were accompanied by the following account:—

"I take the liberty of sending to you a few pods which I collected in Mexico. The leaves and seeds of this tree are said to be highly poisonous, and to produce tetanus in animals eating them. I have examined some of the seeds to find whether they contain strychnine, but have ascertained that that alkaloid is not present. I shall feel obliged if you could tell me whether you know of this plant and whether you could give me any information with respect to it. I understand that very large quantities of these seeds can be obtained in the mountains around Zacatecas in Mexico."

Upon examination these seeds proved to be those of *Sophora secundiflora*, Lagasca, described by Professor Sargent as a small tree or all shrub of Matagorda Bay, Texas, west to the mountains of New

Mexico, forming dense thickets on the borders of streams, generally in low rather moist soil. It has a heavy, hard, close-grained wood of an orange colour streaked with red. The seeds are said to contain an exceedingly poisonous alkaloid known as *Sophorine*. The Indians in the neighbourhood of San Antonio use the seeds as an intoxicant, half a seed producing exhilaration followed by sleep lasting two or three days. A whole bean is said to be sufficient to kill a man.

A Handbook of Australian Fungi has been prepared by Dr. M. C. Cooke, A.L.S., Mycologist in the Herbarium of the Royal Gardens, and published under the authority of the several Governments of the Australian Colonies. It contains a full description of all the fungi so far known to occur in Australia and Tasmania, number 2,084 species. All the genera are illustrated by 36 plates, 20 of which are coloured.

Handbook of Irideæ.—Mr. J. G. Baker, F.R.S., has in the press a handbook of Irideæ, uniform with those which he has already published on the neighbouring orders Amaryllideæ and Bromeliaceæ. The order contains about 60 genera and 800 species, nearly half of the latter being concentrated at the Cape. The large garden genera of the order are *Crocus*, *Iris*, and *Gladiolus*. More than one-half the book is already printed, and it will be completed in a few weeks.

New Cape Liliaceæ.—Mr. J. G. Baker has published in a recent number of *Engler's Jahrbuch* (vol. XV., Part iii, p. 5) descriptions of fifteen new species of Liliaceæ, which were sent to him for examination by Dr. Engler from the Berlin Herbarium. These new species belong to the following genera, viz., *Eriospermum* 1, *Kniphofia* 3, *Tulbaghia* 1, *Urginea* 2, *Drimia* 1, *Dipcadi* 1, *Scilla* 1, *Ornithogalum* 1, *Lachenalia* 2, and *Massonia* 2. The three Kniphofias and several of the others have been collected lately in Pondo-land, which lies on the east coast south of Natal, by a German collector of the name of Bachmann.

New Yucca and Aloe.—Two of the new Liliaceæ seen in a flowerless state in the garden of Mr. Thomas Hanbury, at La Mortola, by Mr. J. G. Baker, during his visit to the Riviera last winter (see the January number of the *Kew Bulletin*) have developed their flowers this summer, and have been fully described by Mr. Baker in the *Gardeners' Chronicle*. These are *Yucca Hanburii* (*Kew Bulletin*, 1892, p. 8), from the Rocky Mountains, a species nearly allied to *Y. angustifolia*, Pursh. (*Bot. Mag.*, tab. 2236), and the Cape Aloe, allied to *Aloe arborescens*, mentioned on page 10 of Mr. Baker's report. The latter is a very distinct plant, and a valuable addition to the small number of large showy species of the genus. It has suberect stems, laxly-disposed lanceolate leaves, a dense raceme of deflexed bright yellow flowers and much-exserted stamens. It has been named *Aloe aurantiaca*, and a full description will be found in the *Gardeners' Chronicle*, 1892, Vol. I., page 780.

The progress made in a Sisal Hemp industry at the Turks and Caicos Islands is discussed as follows in the Blue Book Report (Jamaica) for 1891 :—The cultivation of the Pita (Sisal) plant has made fair progress,

especially in the Caicos Islands, and the reports from the plantations, towards the close of the year, were satisfactory. Two companies, the West Caicos Fibre Company, Limited, at West Caicos, and the East Caicos Company, Limited, at Breezy Point, formed for the purpose of raising pita plants and extracting the fibre, registered under the companies ordinance, and there are several private plantations. A small shipment of fibre was made to New York within the year from one of the latter, and the first quality fetched a cent a pound more than the second quality—an equal price to the best from Yucatan. This speaks well for the quality of the fibre which can be produced in these islands, and promises a bright future for the local fibre industry.

The following note on FRUIT CULTIVATION in the BAHAMAS is given in the Blue Book Report for 1891:—The Colony offers great inducements for fruit-growing. Pine-apples are at present the principal crop, but the particular description of land required for their culture is a limited quantity. Of late years the growth has been much improved by the use of fertilizers, with a considerable increase of quantity. The crop yields large profits. At twopence each an acre of pine-apples returns 40*l.* to 45*l.*, and, though precarious, from its perishable nature, while such results are possible it will continue to be an attractive pursuit. I do not desire to see it extended, as the sole means of the cultivators, beyond its present limits, for the increasing competition of Cuba and Jamaica is a further element of insecurity in the future of this industry. In oranges a good business might be done, if the accounts of Florida enterprise in this fruit are a fair criterion. At present the oranges of this country are roughly handled, being generally shipped in bulk in vessels' holds, and often without compartments. The fruit is equal to any in the world, and when, for the most part, it receives no attention, the result of careful cultivation could not fail to be remunerative. The facilities for production are fully up to those in Florida, and we are entirely free from all risk of frost, which so often blights the Florida crop. The success of the industry in this Colony would be partial, however, until the proper system of packing were adopted to ensure delivery at market in good condition.